Plant Operations Notebook, N-92-03-19

This notebook covers the period March-April 1892. It was used by Edison, primarily for notes from experiments on bricking and reducing phosphorous in Ogden concentrate. Bricking experiments with lime are noted in two series, one running from A-Q, the other from AA-XX. There are also a series of phosphorous tests with unwashed Ogden ore, numbered 1-152, and some cost calculations for producing resinate. The front cover is labeled "Early Bricking & Phosphorus Expts #1." The spine is labeled "130" and "Edison's [no]tes." The book contains 195 numbered pages.

Blank pages not filmed: 4-5, 8-9, 52-53, 112-117.

March 19 1892 -

A very good brick is made with - 200 grammes washed 100 mesh (Brass Sieve) Ogden or with 3 grammes Ogdensburg Clay and 500 Milligrams of stick Soda (Caustic) -
It is sufficiently hard small pieces say inch can hardly be broken by hand - but the instant Cracks in the fire -
it should be brought to full yellow and kept there for 20 minutes at least.

15 CC water

Mch 19/92

600 oz 9 clay + 6 of
sulphate soda is about
as hard as on page 1
Forgot dont crack so much
still it breaks in several
pieces but each piece
is tough it would be ok
was in furnace 1/2 hour
yellow perhaps for 20 @ 25
thermometer - 45-cc water

Mch 19/92 3 (7)

600 ozs q day 45 cc water
6 Carbonated soda - is actually
effect as good as page 1
but requires more prolonged
heat.

Experiments to determine the amount of Lime required for briquets & the manipulations necessary to be made, the minimum quantity of lime to effect the setting the quicker at 930 March 21st practically no setting or coherency

Series A March 19th

600 washed 100 Brassnick Ogden
or = 9 grammes Ogdensburg
Clay. 9 of hot water slaked
Lime in mut = 45 cc water.

8 ingots made -

No 1 & 2 9 soak in water
for 5 seconds, March 21 1892, 930 am

No 3 + 4. soaked 1 second
10 am March 21
on March 22, 3/50 - No 9 broken no coherency no

Series B — finished Mch 19 3 pm

600 grs 6 gmo clay 9 grms Lime
45 cc water = 8 briquets.

No 1 & 2 soaked 5 sec 10 am
Mch 21 — Nos 3 & 4 one
second right in water

at 930 am Mch 21 — practically no
swelling or coherency —

Mch 22 330 pm No 9 broken no coherency
—

Series C mended Mch 19 4 pm

600 grms ore 6 grms CaCl

12 grms Lime 45 cc water

8 briquets - at 930 am Mch 21 -
no setting or coherency

Nos 1 & 2 soaked 5 seconds
right in water - 10 am Mch 21

Nos 3 & 4 soaked one second
10 am Mch 21

Mch 22 No 9 broken no coherency
ng

Series D Monday March 19 430 pm

600 grams Ore 6 grams Clay

15 grams Lime 45 cc water

8 briquets — 930 am very slight evidence of setting —

Nos 1 & 2 soaked 5 minutes

March 21 10 am —

Nos 3 & 4 soaked 1 minute

10 am March 21 -

March 22 - 330 pm first inspection

any coherency yet —

Series E. Moulded 5:30 pm
Mch 19

600 grms Ore 6 grms Clay

18 grms Lime 72 cc

Water 930 am. very perceptible effect
of spalling & coherency Mch 21/92

No 1 + 3 soaked 5 minutes
Mch 21 10 am —

No 4 + 5 — soaked 1 minute
10 am Mch 21/92 —

No 2 broken open —

(Upper) No 1 + 3 5 sec
4 + 5 1 sec

Mch 22 1115 am

Mch 22 330 pm — fairly coherent. requires
quite little pull to break. there is marked
difference between D + E. increase must be
due to difference between D + E. increase must be
500% — its No 9 + shows large amount
of lime or flakes either badly slaked or
badly mixed — must be 15 @ 25%
— pieces —

Series G moulded March 19 6 pm

600 grms Ore 6 grms Clay

21 grms Lime 105 ~~grms~~

C C Water 8 Briquets

930 am surface quite hard setting fairly strong coherency considerable, on breaking air might

Nos 1 + 2 soaked 5 minutes

March 21 10 am

Nos 3 + 4 soaked 1 minute

March 21 10 am

on blegan in get notice lumps lime

I think that the briquet is sufficiently hard to be handled (10) 40 hours setting) + put on the main dump

Dipped 1 + 2 again 5 sec water

3 + 4 1 "

March 22 11½ am

March 22 330 pm Coherency no better than lime badly impaired - fell out ½ coherency necessary

Nos 5 moulded

OVER

Took No 5 G & soaked 1.15 sec
in Very thin mixture of lime &
4.45 pm [illegible]

(23)

Series H — Moulded Mch 21 - 8 am -

600 grms ore 6 grms Clay
24 grms Lime 120 ~~105~~ cc water
8 briquets - Little too wet
to mould - There is 5 cc of water
to 1 gm Lime & is too much
We go back to 4 to 1 -

Dropped No 1 & 2 in water 15 sec
Mch 22 11 10 AM —
+ No 3 + 4 1 sec
Mch 22 330 pm no gas evolved
Coherency than E but the wet
& besides has not been made so
long & will break them same number
of hours - therefore - I find that
there is No 1 unload of 9 & was
previously wet which accounts
for it

Series K -
Started March 21 - 1030 am -
8 briquets =

600 ccs 6 day 30 hours
120 water -

Cant be packed as water is in
excess & its elastic - after moulding
freely hands moved up & it
comes out in 60 and by its own
weight - The briquet is good &
can be semi plastic & moulded
probably be good for production
work where as a dryer one
would have to be handled more
carefully -

Dropped No 1 & 2 & see in Walk
No 3 dry 1 size

March 22 11 10 Am

No 3 K 9 soaked in water 4 minutes until
all bubbles gone 232 pm March 21 -

MN — . slaked lime
Water glass — one
Rough

Series L

600 ozs 6 clay 36 lime
126 cc water
moulded March 21. 1140 am

Dipped 142 : 5 cc water
3 & 4 1 " "

March 22 1110 am

March 22 6 pm - L frog dry
moulds with strong act. cured
possibly be dropped although
1/2 circle broke up when
dropped floor 3 feet into
50% fine & balance to 1/4 4 1/2
inch -

Marked M.

600 ors 6 clay 45 lime

157 water

Moulded Mch 21 12.10 pm

Dropped 1+2 5 sec water
3+4 1 sec "

Mch 22 1110 am

Mch 22 6 pm No q cracked
handly break the ring —
~~drop~~ clay more ele - cohesive
~~[illegible]~~ 3 pt 10% fines
~~[illegible]~~ ~~[illegible]~~ out
80% remained as one piece
of original lime not perfectly
mixed

N

600 oz 6 clay 54 Lime
189 Water = too wet
to mould had to pour it
in a box as a cobble.-

moulded March 21 240 pm

P.

600 ozs 6 clay 66 lime
231 water - just moulds a
thals all - very plastic
Could be squeezed

Moulded Mch 21 3 pm

Dipped 14 2 5 500 water
3x 4 1 "

Mch 22 11 15 am

~~Not~~ Mch 22 6 pm broke No 10
not quite so firm as M.

Marked Q:
600 ors 6 clay 75 lewis
2620 [illegible] — Mch 21 420pm

Dipped 1 + 2 5 sec [illegible]
3 + 4 one sec
Mch 22 1115 am

400 ozs. 8 grammes Coal
Tar Pitch dissolved in 4
grammes Crude petroleum
oil with 4 moulded
~~baked if~~ in dish

baked ~~if coloured well~~
only to dull red then take
right out of oven

200 ozs 2 grammes Sulphate
Barytes finely powdered 2
grammes Carbonate soda
15 cc water (boil)
1/2 hour.

200 oz 3 grms Calced lime
1 gram Borax 15 cc water
Calced 1/2 hour

200 cc 2 Clay 1 Carbonate
200 cc 1 Ivory Black
15 cc bake 1/2 hour

200 grs 1 clay 1 flint spar
500 milligms ~~[illegible]~~ Soda
100 milligms borax 100 milligms
Litharge 15 cc water all
well ground before mixing &
after [illegible] bake 1/2 hour

NaOH 500 milligrams dilluted
15 cc water ⬭ bake ½ hour

200 ors 3. clay - 250 milligrammes Borax 15 cc water in which borax dissolved - ☐ bake 1/2 hour

Series A A.
400 grms. oxz 4 clay 8
Portland Cement 60 cc water
3 6/0x -

Source B.B.
400 grs 4 clay 12 Portland
Cement, 60 cc water

Jordine & C.

400 ctr. of Clay 1/6 Portland
Cement, 65 cc water

Series D D

400 lbs 4 Clay 20 Portland

Cement 65 c c water

Series 8.8

Upper Gray & Reynolds

Cement [illegible]

Series FF

400 ors 4 clay 12 Ravendale
Cement. 60cc water

Series GG

400 wt 4 Clay 16 Rosendale

60 cc water

Acres H H —

400 ors 4 Clay 20

Raymdale 65 cc water

Jones RR.
200 ors 4 cl 0 y 24 Rosehill
65 loads

Jones
L L
400 ac 4 clay 30
Rosendale 65 walen

Screen M.M.

400 pts 4 clay 20 lime
4 portland cement, Cement
and lime after mixed baked
[illegible] and [illegible]

8000 [illegible]

Bowl KN

400 grs 4 clay 20 Lime

8 Portland Cement

8000 water

Series OO

400 ore + Clay 20 lime
50 cc in dilu after slaking
add 300 milligrams sugar
to milk of lime to the
well so all is dissolved.
before mixing

Across P.P.–

Dame ao about 10,000 only monnaie ion gan to 500 milligrammes.

Series QQ -

1400 grs 4 clay 5 oxide
111 magnesia 5 of Cacl2
Dalution of Cl and 111 magnesia
30 cc water "

Series RR

Same as QQ 10 ox magnesia
10 chloride [illegible] 30 water

Iron 55
400 ors 4 cc ay 10 oxide
Mag 5 chloride magnesia
32.5 cc 10 solu

Series TT –

400 on 6 Day 6

Silicate [illegible] – 60 [illegible]

Series VV
400.086 ol ov 4
Silicate [illegible] 60 water

XX in paper box no

3600 ore 36 clay 144 lime

810 H_2O – sayers lime

2 pm – March 23/92 –

Experiments on Dephosphorizing

200 dry washed (badly washed)
100 Brass mesh ore added
3 cc Concd Sulphuric acid
3 cc water
ground in mortar 3 minutes
it washed ore OK – then added
3 cc more water ground
2 minutes. Washed it several
times with a total of
500 cc water same wash
water filtered a took of
clear solution 30 cc
added 2 cc nitric a –
then added 30 cc of
ammonium molybd. Sol
large yellow precipitate –

1 gram Na —
1 " na
1 " na
1 " na
10 gm Rosin
10 gm Rosin
10 gm Rosin
10 gm Rosin
5 gm Rosin
2 ½ gm Rosin

47½ Rosin
4 Na —

Resinate of Soda –

48 Resin - grms
4 Stick ~~Soft~~ Soda grms)

any excess of Resin dont combine –

Weight ~~water~~ of Resin + Na_2O –
52 grammes weight of water
in finished sticky resinate
57 grammes Hence 48 grms
Resin 4 grammes Na_2O pure
makes with water 109
grammes of binding material
I weighed out 8 Lots of ore
200 grammes Each then weighed
out 8 lots of Resinate as above
3 4 5 6 7 8 9 + 10
grammes Each
to the 3 grammes of Resin & 200
ore I had to add 2 cc water
to make it sufficiently wet to

moved it –
to the 4 grammes 2 cc
5 grm 2 cc 6. grammes
1 cc = 7 grammes 1/2 of a
cc ~~+ no~~ within the the
8 9 7 10 —
9. baked them in oven with
doors open – temperature probably
150 for until could just
smell Room Vapor then took
them out. Nos 8 9 7 10
would make a coherent brick
before burning –
~~No~~ 3 grammes dirt alumina 60
lbs sgr mch crushing alumina
would answer. No 4 grammes
could not be broken on Edge
by fingers ~~[illegible]~~ No 5 was
still stronger – the strength
necessary as you go up
Either No 7 or 8 will answer.

But to Coax the furnace man No 9 perhaps would be best & then we can go back to 6 or 7 in time —

$14.^{00}$ for 285 lbs of Resin & can get a cheaper variety — also I allow 3c per lb for Soda perhaps can get it for less but can find Cable by using Caustic Soda Complete

I figure No 3 costs 12c per lb for Resinate N

No 4 —	16c
5 —	20c
6	24c
7 —	28c
8 —	32c
9	36c
10	40c

No 10 stands strong when Red hot —

Even ~~Also~~ the 4 gramme one slaked a red heat & after cooling is stronger than 150 lbs lime 1 week = in fact anything above 4 gramme is strong enough in furnace - without clay

If find that the mixing has got to be just so if there is an excess of water it ~~wont~~ pack but is evidently frothy & when taken out & dried it dont shrink hence dries porous - The Minimum quantity of water should be used - No 8 & 9 & 10 have enough water when the Resinate & water are in equal amounts but 7 6 & 5 would have to have 1 gramme water added for every gramme less than 8.

I tried air drying the ingot it got hard but not near as hard in 10 hours as baking

So it will be necessary to dry the briquets in a chamber at say 120 fahr -

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5 grams Resin 1/2 x 1/2 was obtained
Lost one gramm in 10 hours
Expanded in bulb dish

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100 mesh washed stock takes 88 grammes water per 100 grammes or 2 when it becomes soggy - about the way it would drain off after the washing process - without a centrifugal this amount of machine would have to 6 2 Evaporate - I don't think it could be made to pass through a Y dryer - but what

22
16
76
176
326
37

be dried in a burner on
PR — 18 cc to 100 ore.
is about 400 lbs of water
per ton of ore —

Tumbling Bbl-

10 lbs unwashed Regular Ogden Concentrate - to this 37 grammes H_2SO_4 + 147 grammes water - rotated it 1 hour at 30 Rev per minute by power - stopped it for hour & overnight Took out a sample & then added 150 cc water & rotated it 1/2 hour more. —
then put in lot of water & rotated 1/2 hour more

No 1 on hot plate 1 hour —
stirred several times. —

No 5 put on 1120 taken off 1226

No 2 put on 11:3 taken off 1227.

No 7 put on 1124 taken off 1227

No 9 " " 1127 " " 1227

No 3 - ~~taken~~ put 1115 " " 1247

1 pints with 100 gms of unknown
Reg Ogden Ore —

10 Bottles —

Solution in No 1 2 3 4

~~5 cc~~ 5 cc HNO_3 strong 300 cc
water — put in each bottle 21 cc of solution

No 5 & 6 — to each 3 cc
21 cc + in addition 5 cc water to
each —

No 7 & 8 —
21 cc sol + 10 cc water

No 9 & 10 —
21 cc Sol + 20 cc water

No 4 dried in only
up had put bottle
H_2O in it —

900 cc water.
30 cc H_2SO_4 – }

No. 11 & 12 –

21 cc of solution

13 & 14 –

21 cc sol & 5 cc water

15 & 16 –

21 cc sol & 10 cc water

17 & 18

21 cc sol 20 cc water

No 4	put on	11 15	off	1.45 pm
3	"	11 15	"	1 15 pm
6	"	1120		1247
8		1125		12 55
10		11 28		12 58
11		1155		12 55
12		11 56		1,25
13		1159		12 59
14		12 noon		1.29
15		1217		1.17
16		1218		1 48
17		1219		1.19
18		1222		1,52

~~xx~~ cc water
15 cc 1.18 sp grav H_2SO_4 -
~~standard sol~~ -

Treated No 17 again with stronger acid (hour and and I got out as much as at 1st
Worked it hot,
Even the third time got considerable but found a very heavy white precip at bottom of bly because I overheated it,

I now try

No 21.	41 cc Reg cc		½ hour hot	
22	82 cc	"	½	"
23	123 cc	"	½	"
24 – ~~No~~ 21	with 41	"	½	"
25 – 22	" 82	"	"	"
26 " 23	" 123	"	"	"

No 21 1st time for ½ hour with 123 cc Reg Solution 1 hour hot

22 – No 21 washed with water and another change of 123 cc put in worked hot one hour

No 23 is No 21 again washed in water ~~& another~~ change of 123 cc Reg Solution put in –

These will show progressive diminution of Shaw –

No 30 =

100 grammes ore. 80 cc of

1776 cc H_2O
30 1.8 H_2SO_4 } solution

gently diluted with water
say 250 cc added extra
nearly boiled & stirred for
one hour — then took $\frac{1}{5}$ =
of solution & tested for phos.
Considerable phos dont think
got it all =
Saturday 6 pm

No 31 same ore from 30
Washed then 80 cc Reg
Sol — heated 1/2 hour —
got as much phos. as
31 Saturday 630 pm

33 100 grams ore: about gram Sel Cop
treated for few minutes with
water to take iron out,
then washed — then 108 cc
Reg Sal put in
Saturday 7 pm

32 - to No 30 put at
work for 3rd time 100 cc
Reg - leave at an steam
table cold night
Saturday 7 pm

34 - Treated with 20 cc only
then with ~~40 cc~~ 122 cc 2nd treatment

So far 3 treatments

30 31 + 32 - gives

most.

33 gives nearly as much

say 90% of 30 31 32 -

35 = 100 cc Reg

2 cc of a sol of 1 cc of

nitric in 5 water -

Don't give more than without NO_3 gth 3k

36 - 1 gramme Bi Sub ammonia By faces

40 cc water

Don't turn green keep white

37 = 100 cc Reg 5 grms

Ferrous Sulphate -

Turns very green or blue

~~Liquid Ferrous~~ abt Reg amt P

33 2nd 100 cc Reg

38. 100 cc Req. 1 gram
Sulphate soda — +
1017 am apl 4

39 100 cc Req 1 gram
Chl Sodium +
1035 am apl 4

40 100 cc Req 1 gram
Chl Ammonium +
1016 am apl 4

41 100 cc 1 gram
Chromic acid +
1020 am apl 4

42 100 cc. Req 1 gm
Hcl –

43 - 100 c Req 1 gram
Chl Calcium -
943 am April 4

44 100 cc Req 1 gram
Oxalic acid -
1106 am apl 4

45 100 cc Req. with an equal
~~100~~ quantity 100 cc water
heat on steam plate + stir
for six hours –
1.15 pm 4th

46 - same as 45 but heat.
after 10 hours. 118 pm 4th.
no blue

47. 1 gram of Hydrofluoric
about in 100 cc water.

48. 100 cc Rag
1 gram Chl Zinc +
10 am apl 4

49 100 c.c Rag 1 gram
Sulphate Zinc +
955 am ~~week~~ apl 4

50 100 cc 1 gram
Ferrous Chloride +
1018 am apl 4

51 100 Req. 1 gram
Sulphite Soda. X
1120 am 4th.

52. 100 cc 1 gram
Hyposulphite soda. X
1015 am Apl. 4

53 100 cc Req 1 gram X
Sugar

54. 100 cc 1 gram
Chloride Tin came out
No phos 1012 pm Apl 4

55 1 gram Boric acid
100 cc water
1112 am - Apl. 4

56. 1 gram Chromic acid
100 cc water -
Took out about 1145 am 4th
1/2 or 1/3 what SO4 does

57. 100 cc Rey
2 cc acetic acid
1115 am 4th -

58. 1 cc aqua Regia
in 100 cc water

59. one gram Caustic
Soda - 100 cc water X
1/3 of what SO4 Take out - 1108 am apl 4

60. 1 gram Carb Soda
100 cc water X
1030 am apl 4

61. ~~3 grams~~
100 cc 1 gram Caustic Na
1036 Am apl 4

62 - 1 gram oxalic acid
100 cc water
~~1 gram~~ 1145 am 4th

63 - 1 cc Acetic acid
100 cc water.
Scarcely apply 1145 am 4th

64 1 gram acid potassium
oxalate 100 cc water
3 pm 4th

65 - 100 cc Reg - 1 gram
Common alum —
1205 pm 4th —

66- 100 cc Reg
1 gram acetate Iron
1240 pm 4th
no blue

67. 1 gram Nitrate Iron
100 cc Reg Sol

68 - 1 gram Sesquichloride
Iron 100 cc Reg -
1245 pm 4th

69 - 50 cc Reg
50 cc HCl 880 H2O + 15 HCl
1210 pm 4th

70 - 50 cc Reg
50 cc HgI Sol
no blue 25 cc 880 H2O 15 HNO3
1240 pm 4th

71 - 1 gram permanganate of soda 100 cc Reg

72 - 1st 50 cc Reg - after acted on several hours wash & treat with 30 cc of NO_3 Solution -

73. 100 cc Reg Steamboat
Boil 6 hours
120 pm 4th

74 100 cc Reg Steamboat
Boil 10 hours
1,20 pm - 4th

No 74 washed and dried sent Apl 5 to B & T Blow for assay for Gum phos & sulphur

75 – 1 gm $BiKO_4$ Manganese
1 " Salt

100 cc Reg
210 pm 4th.

76 – about 1 cc Hydroflurin
in paraffin bottle –
50 Water .330.
Nothing Come out,

77 – 50 cc Reg 450 water
put on Steam Bath all
night Watchman during
Each time Comes in put on
at. 1147 pm 4th =
of 420 pm 5th –

420
1147.
33
1633

78 Duplicate of 77

Sept 4th 12 night
79 100 cc Reg 400 cc
water off 430 pm 5th

Sept 4 12 midnight
80 – 150 cc Reg 350 cc water
off 435 pm 5th

Dried 50 gr sand 48 Blue 12 midnight Sept 4
81. 100 cc Reg 150 water
off 438 pm 5th

Sept 4 12 m
82 – 100 cc Reg 1/2 gram
acetate drawn 150 cc water
440 pm 5th

83 – 100 cc – then water
then 50 cc with molybdate
no ore filtered weigh filter
to see how much ore impurities
weight

Wood tar pitch saponified
1 oz to 26 ½ oz ore – No 1
OK

Rather dilute Sweenith Lime
½ oz to lb – OK No 2

~~[illegible]~~ –
3 Brix –
¼ oz to lb of thick
Sue Lime – Sx ccc. lime slight
hard put in 30 cc 17
1 oz of Sue Lime –
4 lb ore – No good water [illegible]

Both Wood tar pitch saponified
+ sweenith lime Sx exceedingly
hard – (Ve) No 1 + 2
Sweenith not so much effective
1 oz water no Wood pitch
soap – OK

2240 / 25 = 90

400 / 16 = 25

25 / 3 / 75

16 | 90 | 5½ grams

525 | 4500 | 8 | 99

4725

3 oz for 16 lbs.

16 | 2240 | 140

16

64

140 / 3 / 26

16 | 42 / 30 / 10

N084 (157)

Took 3 oz Brown sugar
Added 90 cc water then
dilthi over & alumited it
with Hydrate Lime total
weighed 8 oz — O/K

Freddy Makes 3 brix with 84
1/2 oz of above to lb
This is 25-Lbs sugar to
Ton or — O/K good
absorb moisture on surface

85 — 1 oz Corn starch
30 cc water — dilute boil
it puff as Cooldut with
the water olimated be
perhaps 60 cc — made
Brix — Not good

86 – 100 ore washed

1776 X 60 504 – used 3000

Steam bath, stir + keep water up to mark with the water in washed ore. 2000 about the 3000 give need 1/2 inch above ore.

30 minutes

---

87 Same as 86 –

60 minutes

---

88 Same as 86

1 hour 30 minutes

---

89 Same as 86

2 hours

---

90 Same as 86.

3 hours

91 Same as 86
5 hours

92 Same as 86
7 hours

93 Same as 86
10 hours

93 ½
140 grammes of Wood Tar
pitch to Saponified & clear
Solution with 9 grams
Black soda — 125 cc
water — Thinned 8 ½ wind

8) 90000
37750

6

30

94 Bugnets 3 each

Wood patch. as per 93½ —

3.750 gm

1/8 oz to lb — or ~~3 [illegible]~~ each

95 1/8 oz to lb 7½ grams

Indicated 1 pce [illegible]
2 lbs on 15 grms [illegible]

96 1/2 oz to lb — 15 grams

97 3/4 oz to lb — 22½

98 1 oz to lb — 30 grams
This is only real good one

99 – 100 grams starch
5 " Caustic Soda
+ water – whole weighed
1 lb 5 oz 50 grams

100 – [illegible] lb [illegible] oz
oz [illegible] – [illegible] 99 –
(100 mark weight) Tumbler graduating

101 1/2 oz to lb
(100 mark weight) First [illegible] water [illegible]

102 – 1/4 oz to lb oz Ng
(100 mark weight)

103 1/8 oz to lb oz Ng
(100 mark weight) 300 water

104 150 cc [illegible] – 9 grms Soda
(100 mark weight) – oz to lb oz Ng

Steam bath

105- 1776 -120cc 504-

use 30 cc - one hour

Steam Bath

106 Dup of 105 2 hours

Steam Bath

107 1776— 180cc 504

use 30 cc 1 hour

Steam bath

108 Dup of 107 2 hours

Steam Bath

109 1776cc - 210 504 cc

use 30 cc 1 hour

Steam bath

110 Dup of 109 —

111 1776 H_2O 120 SO4 Steam bath
use 15 cc also - 1776 H_2O
40 cc HNO_3 - use 15 cc
1 hour

112 Dupe of 111 Steam bath
2 hours.

113 1776 H_2O. 60 SO4 steam bath.
use 100 milligrams Oxalic
acid - 1 hour

114 Same as 105 but
Cold not heated. 24 hours

115 - Same as 107 Cold
24 hours

116 Same as 109 — Cold
24 hours

117 Same as 111 Cold 24 hours.

118 Same as 113 Cold 24 hours

119 – 30 cc of 1776 – 5 cc SOY for ½ hour only to dissolve in wash, then with 1776 – 60 cc use 30 cc heat 1 hour & bath.

120 Dup of 119 – 2 hours

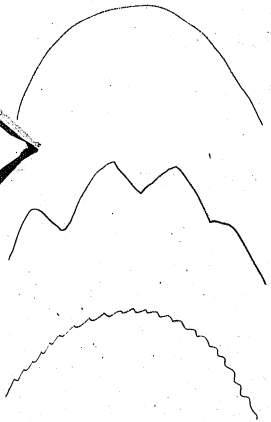
120 – 1776 – 5 cc HCP, use 30 cc – ~~bath~~ Cold ½ hour wash – then 1776 – 50 cc SOY. heat 1 hour

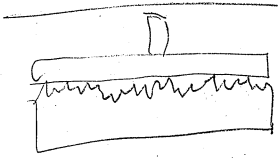
121 Same as 120 – but 2 hours –

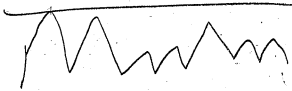
122 — 1776 - 10 acetic,
~~1/2 hour~~ 1/2 hour. boil —
then Wash use 3000 of
1776 — 60 soap — 1 hour

123 Dup of 122 but 2 hours

I found Alum dissolves
[illegible] [illegible] used
[illegible] [illegible] used
to the Big as doubtful
[illegible] dissolves nothing
Use — Oxalic & dilute
dissolve — Chromic is
good Solvent







123 - ignited Crude unwashed
ppt - 1776 - 60 SO4 -
wash 30 cc Steam Bath
hour -
Large precip -

123 2nd with new charge
need very little precip
must come out 1st charge

124 100 gms ignited unwashed
1776 - 60 - SO4 - 16 cc solution
~~cool~~ hot 2 hours - enough water to cover 1/4

125 Same as 124 but 8 cc +
muff water cover 1/4 inch -
2 hours

126 – Same as 124 Cont
4 cc solution + ½ inch water
above – 2 hours hot.

127 Same as 124 Cont.
2 cc solution
2 hours hot.

Filtered. Not ~~[illegible]~~ water stuff from 125 to 132 not roasted
Sample 125 opened 130 pm 19 [illegible] 2 cc cm off bottom [illegible]
130 pm [illegible] day [illegible]
[illegible]

128 – Roasted & ~~[illegible]~~ Crude
Ogden ore – 880 cc water
30 cc SO4 1:8 — 24 cc
of solution – unwashed
Cold

130 pm [illegible]
Same as above but

129 = 32 cc Saturated sol
of Sulphurous acid
Cold

130 pm [illegible]
130 – Same as 128 Cont

64 Sol SaC Sulphurous
acid
Cold

130 pm Tuesday

131. Same as 128 but with 32 cc of a HCl Sol 880 cc to 15 cc acid — Cold

130 pm Tuesday

132 — Same as 128 — but 15 cc of 880 1.5 HNO_3 — with 30 water — Cold

133 — Dried Black residue (cold leaches)

16 cc ~~to~~ muff water to cover

880 — 30 cc — Cold —

100 grms ore — Treated hot

dont think whole granulity of phos came down — NHy gave a 4/5 ths heavy white precip think it nearly all Alumina — very little iron = ~~[illegible]~~ unparalled quantity of Alumina

~~pp~~ 4 pm —

ALL MESSAGES TAKEN BY THIS COMPANY ARE SUBJECT TO THE FOLLOWING TERMS:

To guard against mistakes or delays, the sender of a message should order it REPEATED; that is, telegraphed back to the originating office for comparison. For this, one-half the regular rate is charged in addition. It is agreed between the sender of the following message and this Company, that said Company shall not be liable for mistakes or delays in the transmission or delivery, or for non-delivery of any UNREPEATED message, beyond the amount received for sending the same; nor for mistakes or delays in the transmission or delivery, or for non-delivery of any REPEATED message beyond fifty times the sum received for sending the same, unless specially insured, nor in any case for delays arising from unavoidable interruption in the working of its lines, or for errors in cipher or obscure messages. And this Company is hereby made the agent of the sender, without liability, to forward any message over the lines of any other Company when necessary to reach its destination.

Correctness in the transmission of a message to any point on the lines of this Company can be insured by contract in writing, stating agreed amount of risk, and payment of premium thereon, at the following rates, in addition to the usual charge for repeated messages, viz, one per cent. for any distance not exceeding 1,000 miles and two per cent. for any greater distance. No employee of the Company is authorized to vary the foregoing.

No responsibility regarding messages attaches to this Company until the same are presented and accepted at one of its transmitting offices; and if a message is sent to such office by one of the Company's messengers, he acts for that purpose as the agent of the sender.

Messages will be delivered free within the established free delivery limits of the terminal office. For delivery at a greater distance, a special charge will be made to cover the cost of such delivery.

The Company will not be liable for damages or statutory penalties in any case where the claim is not presented in writing within sixty days after the message is filed with the Company for transmission.

THOS. T. ECKERT, General Manager. NORVIN GREEN, President.

(183)

134 — 20 reg ore ground in Rotating grinder + frequently washed. 80% about passing 100 mesh but its very much finer than 100 mesh sifted out of washed Ogden — This sample is not sifted through any mesh

135 is same as 134 except that it is worked with small hand magnet Key + 2 cells Celanc

136 is same as 134 but passed through 100 mesh + was cleaned by Magnet,

No Fe sulphate. Fe –

137 – 1000 cc H_2O

20 cc H_2SO_4 –

Stirred 3 times from 8 till 1120 am

Leaving Very thing free acid – no metallic Fe.

used 100 gram washed 50 mesh Crude oxalate dried roasted – put on 10 pm 24th taken off 1120 am 26th

138 – 1000 cc water

35 cc HCl.

Ore same as 137 – 100 gram

plenty free acid No Fe sulphate also

No Fe sulphate also

139 1000 cc water

plenty free acid – 7 cc HNO_3

Ore same as 137 –

140 – 1000 cc water
15 cc H_2SO_4

Took 33 cc of solution – Degd
roasted ore Crude washed
1050 am 27th –

141 – Same as 140 –
1050 am 27th

142 – Same as 140 –
1215 pm 27th

143 do
1215 pm 27

144 do
1215 pm 27th

put on steam plate with blotting
paper under –
took off at 520 pm –

Comes 12 midnight

145 ditto.
1214 pm-27
put on steam plate with
blotting paper under.

146. 1000 cc water
20 cc HCl
used 33 cc of sol to 100 gm.
Dead root.
~~[illegible]~~
137 pm

147 do
137 pm

148 do on steam plate
137 pm Comes off 633 pm.

149 do on steam plate
137 pm Comes 12 midnight

1 ton to hp — 15 hours
1100 — 7½
550 — 37½

1500
1½ Hrs

12) 550 (45
48
70

45 lbs per lift for 3 3/4 hours

800000

100) 45000000 (2008
2240
4480
20000
20160

160
32000
9

2008 tons

72000
20000
90000
10000
27
137000

1200
250
75

10

200
200000
32000
20000
72000

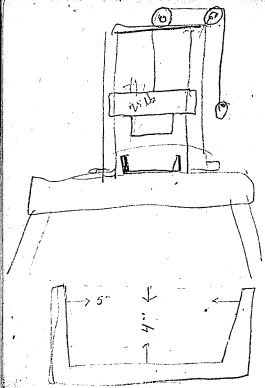
150. 1000 cc
$6\frac{1}{3}$ cc HNO_3 —

used 33 cc solution to 100 grms Dead roast washed Crude microcline — put on heating plate 2 pm 27 Comes off 6 33 pm

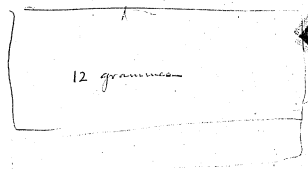
151 — do

152 do put on heating plate 2 pm 27th
Comes off 12 midnight

Acid Electrolyte	137	P .016	SO_4	1000	20 cc	33 Ref
	138	.015	HCl	1000	35 cc	33 "
	139	.017	NO_3	1000	7 cc	33 "
Alkaline Electrolyte	144	.014	SO_4	1000	15 cc	33 "
	145	.015	do	do	12 hours on hot plate	
	148	.017	HCl	1000	20 cc	33 ref. 5 hours
	149	.014	HCl	1000	20 cc	33 ref 12 hours
	150	.023	NO_3	1000,	65 cc	33 ref 5 hours
	152	.022	"	"	"	" 10 hours



$\frac{1}{32}$ lapse



1 to 200 ozs 11 lbs 33c

$\frac{1}{12}$ lb - to 200 ozs. 33 for No. 2 oz

$\frac{1}{24}$ to 200 $16\frac{1}{2}$ c

$\frac{1}{48}$ $8\frac{1}{4}$